CLAIMS

1. An electroacoustic transducer comprising

- a magnetic circuit having a first and a second gap, each of the first and second gaps having an upper and a lower portion, the magnetic circuit further comprising magnetic means so to establish a magnetic field in each of the first and second gaps,

- an upper diaphragm , and

- an upper coil system comprising at least one coil forming an electrically conducting path, the upper coil system having portions of the electrically conducting path fastened to the upper diaphragm, the upper coil system further having first and second gap portions of its electrically conducting path situated in respective ones of the upper portions of the first and second gaps,

wherein

the magnetic means comprises a magnet arranged so that each of its magnetic poles defines a surface of respective ones of the first and second gaps.

2. A transducer according to claim 1, wherein the first and second gap portions of the upper coil system are adapted to conduct electrical current in substantially the same direction.

3. A transducer according to claim 1, wherein a flexible circuit board, such as a flexprint, forms the upper diaphragm, and wherein the upper coil system is formed by electrically conducting paths on the flexible circuit board.

4. A transducer according to claim 3, further comprising electronic means mounted on the flexible circuit board.

5. A transducer according to claim 3, wherein the electronic means comprise an impedance converter.

6. A transducer according to claim 1, wherein the upper coil system comprises at least two separate coils.

7. A transducer according to claim 1, wherein the upper coil system comprises two separate coils.

8. A transducer according to claim 7, wherein the two separate coils are connected in series.

9. A transducer according to claim 7, wherein the two separate coils are connected in parallel.

10. A transducer according to claim 1, wherein the upper coil system comprises one single coil.

11. A transducer according to claim 1, wherein the magnetic circuit comprises a body of magnetically conductive material, the body having one opening, the opening having a pair of opposed surfaces, each of the opposed surface defining a surface of respective ones of the first and second gaps.

12. A transducer according to claim 11, wherein the opening in the magnetic circuit is through-going.

13. A transducer according to claim 11, wherein each pair of surfaces defining a gap are substantially plane surfaces being substantially parallel to each other.

14. A transducer according to claim 11, wherein the magnet is positioned symmetrically in the opening of the body of magnetically conductive material.

15. A transducer according to claim 1, wherein the magnetic circuit further comprises a pole shoe arranged in a plane substantially parallel to the diaphragm.

16. A transducer according to claim 1, wherein the upper diaphragm has electrically conductive portions, and wherein the upper coil system has electrically conducting path ends electrically connected to the electrically conductive portions of the diaphragm, the electrically conductive portions further having externally accessible portions for electrically terminating the transducer.

17. A transducer according to claim 1, further comprising an upper front cover positioned in front of the upper diaphragm so as to protect the diaphragm.

18. A transducer according to claim 17, wherein the upper front cover comprises at least one acoustic opening.

19. A transducer according to claim 18, wherein the at least one acoustic opening in the upper front cover is positioned at an upper front part of the front cover.

20. A transducer according to claim 18, wherein the at least one acoustic opening in the upper front cover is positioned in a side part of the front cover.

21. A transducer according to claim 17, wherein the upper front cover forms a substantially airtight interface with the magnetic circuit.

22. A transducer according to claim 1, further comprising a casing for housing the magnetic circuit, the casing comprising a rectangular-shaped opening being defined by two pairs of edges, the upper diaphragm being attached to the casing in a manner so as to at least partly cover the rectangular-shaped opening.

23. A transducer according to claim 22, wherein the upper diaphragm has a rectangular shape so as to cover the rectangular-shaped opening of the casing.

24. A transducer according to claim 23, wherein the upper diaphragm is attached to one of the two pairs of edges of the casing.

25. A transducer according to claim 23, wherein the diaphragm is attached to both pairs of edges of the casing.

26. A transducer according to claim 22, further comprising an upper front cover positioned in front of the upper diaphragm, wherein the upper front cover is attached to at least part of the casing.

27. A transducer according to claim 26, wherein the upper front cover comprises at least one acoustic opening.

28. A transducer according to claim 27, wherein the at least one acoustic opening in the upper front cover is positioned at an upper front part of the front cover.

29. A transducer according to claim 27, wherein the at least one acoustic opening of the upper front cover is positioned in a side part of the front cover.

30. A transducer according to claim 26, wherein the upper front cover forms a substantially airtight interface with the two pairs of edges of the casing.

31. A transducer according to claim 1, further comprising

- a lower diaphragm, and

- a lower coil system comprising at least one coil forming an electrically conducting path, the lower coil system having portions of the electrically conducting path fastened to the lower diaphragm, the lower coil system further having first and second gap portions of its electrically conducting path situated in respective ones of the lower portions of the first and second gaps.

32. A transducer according to claim 31, wherein the transducer is configured so as to drive the upper and lower diaphragms in phase.

33. A transducer according to claim 31, wherein the transducer is configured so as to drive the upper and lower diaphragms out of phase.

34. A transducer according to claim 31, wherein a flexible circuit board, such as a flexprint, forms the lower diaphragm, and wherein the lower coil system is formed by electrically conducting paths on the flexible circuit board.

35. A transducer according to claim 34, further comprising electronic means mounted on the flexible circuit board.

36. A transducer according to claim 35, wherein the electronic means comprise an impedance converter.

37. A transducer according to claim 31, further comprising a lower front cover positioned in front of the lower diaphragm so as to protect the diaphragm.

38. A transducer according to claim 37, wherein the lower front cover comprises at least one acoustic opening.

39. A transducer according to claim 38, wherein the at least one acoustic opening in the lower front cover is positioned at a lower front part of the front cover.

40. A transducer according to claim 38, wherein the at least one acoustic opening in the lower front cover is positioned in a side part of the front cover.

41. A transducer according to claim 37, wherein the lower front cover forms a substantially airtight interface with the magnetic circuit.

42. A transducer according to claim 38, wherein the lower front cover is attached to at least part of a casing.

43. A transducer according to claim 42, wherein the lower front cover forms a substantially airtight interface with the casing.

44. A coil system for use in a transducer, the coil system comprising

- a substantially flat fastening portion for fastening the coil system to a diaphragm, and

- at least two gap portions outside the fastening plane, each gap portion comprising a plurality of electrically conducting segments being substantially parallel to the fastening portion.

45. A coil system according to claim 40, wherein the electrically conducting segments in the gap portions are substantially linear.

46. A coil system according to claim 44, wherein the coil system is formed by a wounded electrically conducting wire.

47. A coil system according to claim 44, wherein the coil is formed by electrically conducting paths formed on a flexible circuit board, such as a flexprint.

48. A coil system according to claim 47, further comprising electronic means mounted on the flexible circuit board.

49. A coil system according to claim 48, wherein the electronic means comprise an impedance converter.

50. A method of manufacturing a coil system according to claim 42 from an electrically conducting wire, the method comprising the steps of:

- producing, from an electrically conducting wire, a coil defining a coil axis,

- bending the coil around a bending axis perpendicular to the coil axis.

51. An electroacoustic transducer comprising

- a magnetic circuit having a gap having an upper and a lower portion, the magnetic circuit further comprising magnetic means so to establish a magnetic field in the gap,

- an upper diaphragm, and

- an upper coil system comprising at least one coil forming an electrically conducting path, the upper coil system having portions of the electrically conducting path fastened to the upper diaphragm, the upper coil system further having gap portions of its electrically conducting path situated in the upper portion of the gap,

wherein

the magnetic means comprises a magnet arranged so that one of its magnetic poles defines a surface of the gap.

52. A transducer according to claim 51, wherein the upper coil system comprises at least two separate coils adapted to conduct electrical current in substantially the same direction.

53. A transducer according to claim 51, wherein a flexible circuit board, such as a flexprint, forms the upper diaphragm, and wherein the upper coil system is formed by electrically conducting paths on the flexible circuit board.

54. A transducer according to claim 53, further comprising electronic means mounted on the flexible circuit board.

55. A transducer according to claim 54, wherein the electronic means comprise an impedance converter.

56. A transducer according to claim 51, wherein the upper coil system comprises two separate coils.

57. A transducer according to claim 56, wherein the two separate coils are connected in series.

58. A transducer according to claim 56, wherein the two separate coils are connected in parallel.

59. A transducer according to claim 51, wherein the upper coil system comprises one single coil.

60. A transducer according to claim 51, wherein the magnetic circuit comprises a body of magnetically conductive material, the body having one opening with a pair of opposed surfaces, one of these surfaces defining a surface of the gap.

61. A transducer according to claim 60, wherein the opening is through-going.

62. A transducer according to claim 60, wherein the surfaces defining the gap are substantially plane surfaces being substantially parallel to each other.

63. A transducer according to claim 51, wherein the magnetic circuit, further comprises a pole shoe arranged in a plane substantially parallel to the diaphragm.

64. A transducer according to claim 51, wherein the upper diaphragm has electrically conductive portions, and wherein the upper coil system has electrically conducting path ends electrically connected to the electrically conductive portions of the diaphragm, the electrically conductive portions further having externally accessible portions for electrically terminating the transducer.

65. A transducer according to claim 51, further comprising an upper front cover positioned in front of the upper diaphragm so as to protect the diaphragm.

66. A transducer according to claim 65, wherein the upper front cover comprises at least one acoustic opening.

67. A transducer according to claim 66, wherein the at least one acoustic opening in the upper front cover is positioned at an upper front part of the front cover.

68. A transducer according to claim 66, wherein the at least one acoustic opening in the upper front cover is positioned in a side part of the upper front cover.

69. A transducer according to claim 65, wherein the upper front cover forms a substantially airtight interface with the magnetic circuit.

70. A transducer according to claim 51, further comprising a casing for housing the magnetic circuit, the casing comprising a rectangular-shaped opening being defined by two pairs of edges, the upper diaphragm being attached to the casing in a manner so as to at least partly cover the rectangular-shaped opening.

71. A transducer according to claim 70, wherein the upper diaphragm has a rectangular shape so as to cover the rectangular-shaped opening of the casing.

72. A transducer according to claim 71, wherein the upper diaphragm is attached to one of the two pairs of edges of the casing.

73. A transducer according to claim 71, wherein the upper diaphragm is attached to both pairs of edges of the casing.

74. A transducer according to claim 70, further comprising an upper front cover positioned in front of the upper diaphragm, wherein the upper front cover is attached to at least part ofthe casing.

75. A transducer according to claim 74, wherein the upper front cover comprises at least one acoustic opening.

76. A transducer according to claim 75, wherein the at least one acoustic opening in the upper front cover is positioned at an upper front part of the upper front cover.

77. A transducer according to claim 75, wherein the at least one acoustic opening of the upper front cover is positioned in a side part of the upper front cover.

78. A transducer according to claim 74, wherein the upper front cover forms a substantially airtight interface with the two pairs of edges of the casing.

79. A transducer according to claim 51, further comprising

- a lower diaphragm, and

- a lower coil system comprising at least one coil forming an electrically conducting path, the lower coil system having portions of the electrically conducting path fastened to the lower diaphragm, the lower coil system further having gap portions of its electrically conducting path situated in the lower portion of the gap.

80. A transducer according to claim 79, wherein the transducer is configured so as to drive the upper and lower diaphragms in phase.

81. A transducer according to claim 79, wherein the transducer is configured so as to drive the upper and lower diaphragms out of phase.

82. A transducer according to claim 79, wherein a flexible circuit board, such as a flexprint, forms the lower diaphragm, and wherein the lower coil system is formed by electrically conducting paths on the flexible circuit board.

83. A transducer according to claim 82, further comprising electronic means mounted on the flexible circuit board.

84. A transducer according to claim 83, wherein the electronic means comprise an impedance converter.

85. A transducer according to claim 79, further comprising a lower front cover positioned in front of the lower diaphragm so as to protect the diaphragm.

86. A transducer according to claim 85, wherein the lower front cover comprises at least one acoustic opening.

87. A transducer according to claim 86, wherein the at least one acoustic openingin the lower front cover is positioned at a lower front part of the lower front cover.

88. A transducer according to claim 86, wherein the at least one acoustic opening in the lower front cover is positioned in a side part of the lower front cover.

89. A transducer according to claim 85, wherein the lower front cover forms a substantially airtight interface with the magnetic circuit.

90. A transducer according to claim 85, wherein the lower front cover is attached to at least part of a casing.

91. A transducer according to claim 90, wherein the lower front cover forms a substantially airtight interface with two pairs of edges of the casing.